



**US Army Corps  
of Engineers®**  
Engineer Research and  
Development Center

# Physical General Model of John Day Lock and Dam, Columbia River



**Aerial photo of John Day Lock and Dam, Columbia River, showing the site simulated by physical model**

## **Purpose**

The John Day physical general model is used to conduct studies of how proposed modifications to the spillway and powerhouse operations would affect the passage of migratory fish. The model demonstrates the resulting navigation conditions and flow patterns.

## **Specifications**

The John Day physical general model is a 1:80-scale fixed bed type created by [Coastal and Hydraulics Laboratory](#) staff that replicates more than 6 river miles of the Columbia River, including the navigation lock, dam, and powerhouse. The model, which is used primarily by USACE Districts, other government agencies, and biological agencies affected by the Columbia River, has been in use since 1995. Its functions are to view and study current patterns created with various spillway operations, study the current pattern effects of installing flow deflectors on the dam, study current pattern effects of installing surface bypass systems on bays of the powerhouse, and study effects on navigation with the proposed modifications to the dam and/or powerhouse. The model uses a Video Tracking System (VTS) that allows timely collection and processing of current directions and velocities. Acoustic Doppler Velocimeters are used to obtain point velocities. A Web cam is installed to allow remote viewing via the Internet of model activities and testing by Corps Districts and other interested parties.

**Benefits** The model has been used to evaluate changes in navigation conditions to the lock approach after installation of flow deflectors on the dam. The model has also been used for biological agencies to determine the operation of powerhouse units and spillway gates to provide optimum egress conditions for migratory fish.

**Success Stories** The model is presently being prepared for studies to improve model performance as compared to prototype data collected in April 2003. The model users have been Portland District engineering and biological personnel and the United States Geological Survey (USGS). The model has been used to develop the operation schedule of the spillway and powerhouse for the prototype to be used during the April-October spill seasons.

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